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/
/FORTRAN CALLABLE LIGHT PEN TRACK ROUTINE
/FOR VT-15 DISPLAY SYSTEM
/
/CHARLES F. DAVIS          SEPT. 1970
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/MAYNARD, MASS.
/
/ EDIT #001 12/19/72 S. ROOT
/ EDIT #002 10/24/73 S. ROOT UPDATE FOR F4 044
/ EDIT #003 8/3/74 SCR DRAW OPTION NEEDS ADDT'NL ARG. UNDER F4 044
/ SINCE NO ARRAY DESCRIPTOR BLOCK WITH ARRAY SIZE
/ F4 044 CAN'T TELL A PROVIDED ZERO FROM A PROVIDED
/ EDIT #004 8/5/74 SCR ARRAY WITH FIRST LOC ZERO. USE PRESENCE OF 5TH
/ ARG. TO TELL DRAWING FROM TRACKING!
/ EDIT #005 8/1/75 SCR CHECK MF.102=0; TRACK SYMBOL CENTERED
/ EDIT #006 8/20/75 SCR ERROR .INIT CAL:DRAW FILE HEADR
/ EDIT #007 9/2/75 SCR COPYRIGHT
/
. IODEV 10.-3
/
/ REMOVE REFERENCE TO VTIOB IN VTA. HANDLER. CALL TO TRACK
/ WITH OUTSTANDING LTORPB WILL LOOP ON CAL UNTIL LTORPB DONE.
/ VTIOB NO LONGER IN .GLOBL; DZM* VTIOB PRIOR TO LABEL TCK1
/ REMOVED. NO OTHER CHANGES MADE FOR EDIT #001. S. ROOT.
/
. GLOBL TRACK. MF.102. .DA
/
/ SYMBOL DEFINITIONS
/
144000 A PX=144000 /X-PARAMETER
140000 A PY=140000 /Y-PARAMETER
020000 A INT=020000 /INTENSIFICATION
/
420000 A V10=420000 /INTENSIFIED VECTORS IN THE DIRECTIONS INDICATED (0-7)
422000 A V11=422000
424000 A V12=424000
426000 A V13=426000
430000 A V14=430000
432000 A V15=432000
434000 A V16=434000
436000 A V17=436000
/
400000 A V0=400000 /NON-INTENSIFIED VECTORS IN THE DIRECTIONS INDICATED (0-7)
402000 A V1=402000
404000 A V2=404000
406000 A V3=406000
410000 A V4=410000
412000 A V5=412000
414000 A V6=414000
416000 A V7=416000
/

```

73	210002 A	OSET=210002	/OFFSET OFF
74	210040 A	ROTOF=210040	/ROTATE OFF
75	211000 A	BKOF=211000	/BLINK OFF
76	200020 A	INCROF=200020	/INCREMENT OFF
77		/	
78	234400 A	LDNM=234400	/LOAD NAME REGISTER
79	210014 A	LPON=210014	/LIGHT PEN ON
80	210010 A	LPOF=210010	/LIGHT PEN OFF
81		/	
82	200000 A	DNOP=200000	/DISPLAY NOP
83	600000 A	DJMP=600000	/DISPLAY JUMP
84	620000 A	DJMPI=620000	/DISPLAY JUMP INDIRECT
85	640000 A	DJMS=640000	/DISPLAY JMS
86	660000 A	DJMSI=660000	/DISPLAY JMS INDIRECT
87	235000 A	DSKP=235000	/DISPLAY SKIP
88	203600 A	INT7=203600	/INTENSITY LEVEL 7
89	202600 A	INT3=202600	/INTENSITY LEVEL 3
90		.EJECT	

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91
92 /LIGHT PEN TRACK ROUTINE
93 /VT-15 DISPLAY SYSTEM
94 /
95 00000 R 000000 A TRACK 0
96 00001 R 120512 E JMS* .DA /GETS CALL ARGUMENTS
97 00002 R 600010 R JMP .+6 /JUMP PAST ARGUMENT STORAGE
98 00003 R 000000 A TX .DSA 0 /X POSITION
99 00004 R 000000 A TY .DSA 0 /Y POSITION
100 00005 R 000000 A TOPTA .DSA 0 /OPTION DESIRED
101 00006 R 000000 A TARRA .DSA 0 /ARRAY POINTER
102 00007 R 000000 A TSIZE .DSA 0 /SIZE OF DRAW ARRAY (EDIT #003)
103 /OPTIONS 0-NO CONSTRAINTS
104 / 1-MOVEMENT RESTRICTED IN +Y AND -Y DIRECTIONS
105 / 2-MOVEMENT RESTRICTED IN +X AND -X DIRECTIONS
106 / 3-MOVEMENT RESTRICTED IN -X DIRECTION
107 / 4-MOVEMENT RESTRICTED IN -Y DIRECTION
108 / 5-MOVEMENT RESTRICTED IN +X DIRECTION
109 / 6-MOVEMENT RESTRICTED IN +Y DIRECTION
110 /
111 00010 R 777773 A TCK1 LAW -5
112 00011 R 360000 R TAD* TRACK
113 00012 R 240000 R XOR TRACK
114 00013 R 500377 R AND (7777
115 00014 R 741200 A SNA
116 00015 R 140006 R DZM TARRA /EDIT #004, TELL TRACK FROM DRAW
117 /
118 00016 R 200400 R LAC (PX /SET INITIAL POSITION TO BEGIN TRACK
119 00017 R 040426 R DAC TNAM2 /INITIALIZE TNAM2 TO VALUE OTHER THAN 0-7
120 00020 R 360003 R TAD* TX /GET INITIAL X VALUE
121 00021 R 040434 R DAC TRCK1 /DEPOSIT POINT X IN THE DISPLAY FILE
122 00022 R 200401 R LAC (PY!INT /GET INTENSIFIED POINT Y INSTRUCTION
123 00023 R 360004 R TAD* TY /GET INITIAL Y VALUE
124 00024 R 040435 R DAC TRCK1+1 /DEPOSIT POINT Y IN THE DISPLAY FILE
125 00025 R 220511 E TCK2 LAC* MF.102 /GET POINTER TO BOTTOM OF MAIN FILE
126 00026 R 741200 A SNA /SKIP IF MAIN FILE RUNNING ***005***
127 00027 R 620000 R JMP* TRACK /NO, SO JUST EXIT ***005***
128 00030 R 040053 R DAC TTEMP1 /STORE POINTER TO MAIN FILE BOTTOM
129 00031 R 040054 R DAC TTEMP2
130 00032 R 040055 R DAC TTEMP3
131 00033 R 440053 R ISZ TTEMP1 /MOVE POINTER TTEMP1 TO BOTTOM +1
132 00034 R 440055 R ISZ TTEMP3 /MOVE POINTER TTEMP3 TO BOTTOM +2
133 00035 R 440055 R ISZ TTEMP3
134 00036 R 220054 R LAC* TTEMP2 /MOVE DJMP* TOP+1 DOWN ONE LOCATION
135 00037 R 060053 R DAC* TTEMP1
136 00040 R 200416 R LAC TRCKA /GET ADDRESS OF TRACK DISPLAY FILE
137 00041 R 060055 R DAC* TTEMP3
138 00042 R 200055 R LAC TTEMP3
139 00043 R 500402 R AND (17777 /MASK 13 BITS TO GET ADDRESS
140 00044 R 340403 R TAD (DJMSI /CREATE DJMS* TO TRACK DISPLAY FILE
141 00045 R 060054 R DAC* TTEMP2 /PUT THE DJMS* IN THE MAIN FILE
142 00046 R 220005 R TCK3 LAC* TOPTA /USES OPTION ARGUMENT AS AN INDEX VALUE

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143	00047 R 340404 R	TAD	(TDISP	/GET BASE ADDRESS OF DISPATCH TABLE
144	00050 R 040055 R	DAC	TTEMP3	/STORES INDEXED DISPATCHED TABLE ADDRESS
145	00051 R 200501 R	LAC	TSIDEX	/GET LOAD NAME REGISTER INSTRUCTION (167)
146	00052 R 620055 R	JMP*	TTEMP3	/JUMPS TO DISPATCH TABLE
147	00053 R 000000 A	TTEMP1	0	/POINTER TO MAIN FILE
148	00054 R 000000 A	TTEMP2	0	/POINTER TO FOLLOWING MAIN FILE LOCATION
149	00055 R 000000 A	TTEMP3	0	
150			.EJECT	

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151
152 /DISPATCH TABLE TO JUMP TO USER SPECIFIED OPTION
153 /THE OPTIONS SET UP THE VECTOR TABLE TO RESTRICT MOVEMENT
154 /
155 000056 R 600065 R TDISP JMP TARSET /OPTION DISPATCH TABLE, OPTION 0
156 000057 R 600164 R TOPT1 JMP THORZ /OPTION 1
157 000060 R 600173 R JMP TVERT /OPTION 2
158 000061 R 600134 R JMP TDIR0 /OPTION 3
159 000062 R 600142 R JMP TDIR2 /OPTION 4
160 000063 R 600150 R JMP TDIR4 /OPTION 5
161 000064 R 600156 R JMP TDIR6 /OPTION 6
162 000065 R 200006 R TARSET LAC TARRA /IS TRACKING OR DRAWING (EDIT #004)
163 000066 R 741200 A SNA /NON-ZERO IF DRAW PRESENT
164 000067 R 600236 R JMP TREAD /JUMP TO FIRST READ IF ARRAY NOT PRESENT
165 000070 R 040421 R DAC TARPT0 /SETS POINTER TO ARRAY TOP
166 000071 R 340405 R TAD (+2 /POINT TO SETPOINT POSITION IN FILE
167 000072 R 040422 R DAC TARPT1 /SETS POINTER TO WORD 3 OF ARRAY
168 000073 R 200406 R LAC (4 / (EDIT #006) INIT FILE TOP POINTER
169 000074 R 060421 R DAC* TARPT0 / (EDIT #006)
170 000075 R 200434 R TCK4 LAC TRCK1 /SET ORIGIN OF THE TRACKING POINT IN THE USERS ARRAY
171 000076 R 060422 R DAC* TARPT1 /SET X POSITION
172 000077 R 440422 R ISZ TARPT1
173 00100 R 200435 R LAC TRCK1+1
174 00101 R 060422 R DAC* TARPT1 /SET Y POSITION
175 00102 R 200422 R LAC TARPT1
176 00103 R 040423 R DAC TARPT2
177 00104 R 440422 R ISZ TARPT1
178 00105 R 200407 R TCK5 LAC (+1
179 00106 R 340421 R TAD TARPT0 /GET ADDRESS OF ARRAY LOCATION 1, FIRST ARRAY ELEMENT
180 00107 R 040510 R DAC TRCK3
181 00110 R 500402 R AND (17777)
182 00111 R 340410 R TAD (DJMPI /COMBINE ADDRESS WITH DJMPI INSTRUCTION
183 00112 R 060422 R DAC* TARPT1 /DEPOSIT DJMPI INTO ARRAY WORD 3
184 00113 R 200417 R LAC TRCK3A /GET DJMSI TRCK3 INSTRUCTION
185 00114 R 040506 R DAC TRCK2 /DEPOSIT JMSI TO ARRAY+1 IN TRCK DISPLAY FILE
186 /
187 00115 R 777772 A LAW -6 /EDIT (#003) REMOVE 3 LINES
188 00116 R 360007 R TAD* TSIZE /COMPUTE CONTROL COUNT FROM ARRAY SIZE
189 00117 R 500402 R AND (17777) /USER SUPPLIED SIZE (EDIT #003)
190 00120 R 741101 A SPAICMA /GET THE ARRAY SIZE, LAST 13 BITS
191 00121 R 600320 R JMP TMESS /MAKE NEGATIVE COUNT, SKIP IF OK (EDIT #004)
192 00122 R 040420 R DAC TARCNT /FLAG ILLEGAL COUNT WITH FULL MESS (EDIT #004)
193 00123 R 040424 R DAC TSTCNT /COUNTER TO TEST AVAILABLE LOCATIONS
194 00124 R 200422 R LAC TARPT1 /COUNTER FOR INITIALIZATION
195 00125 R 040055 R DAC TTEMP3
196 00126 R 220422 R LAC* TARPT1 /SET UP INITIALIZATION POINTER
197 00127 R 440055 R ISZ TTEMP3
198 00130 R 060055 R DAC* TTEMP3 /FILL UP USERS VECTOR ARRAY WITH DJMPI TO TOP+1
199 00131 R 440424 R ISZ TSTCNT
200 00132 R 600127 R JMP -3
201 00133 R 600236 R JMP TREAD /GO TO FIRST READ
202 .EJECT

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/ROUTINES TO SET UP NAME REGISTERS IN TRACK DISPLAY FILE
/AS DETERMINED BY OPTION CALLED FOR
/SET UP PERFORMED BY INTERCHANGING NAME REGISTERS
/
00134 R 040461 R TDIR0 DAC TSIDE4 /RESTRICTS MOVEMENT IN -X DIRECTION
00135 R 200451 R LAC TSIDE2
00136 R 040455 R DAC TSIDE3
00137 R 200471 R LAC TSIDE6
00140 R 040465 R DAC TSIDE5
00141 R 600065 R JMP TARSSET
/
00142 R 040471 R TDIR2 DAC TSIDE6 /RESTRICTS MOVEMENT IN -Y DIRECTION
00143 R 200461 R LAC TSIDE4
00144 R 040465 R DAC TSIDE5
00145 R 200441 R LAC TSIDE0
00146 R 040475 R DAC TSIDE7
00147 R 600065 R JMP TARSSET
/
00150 R 040441 R TDIR4 DAC TSIDE0 /RESTRICTS MOVEMENT IN +X DIRECTION
00151 R 200451 R LAC TSIDE2
00152 R 040445 R DAC TSIDE1
00153 R 200471 R LAC TSIDE6
00154 R 040475 R DAC TSIDE7
00155 R 600065 R JMP TARSSET
/
00156 R 040451 R TDIR6 DAC TSIDE2 /RESTRICTS MOVEMENT IN +Y DIRECTION
00157 R 200441 R LAC TSIDE0
00160 R 040445 R DAC TSIDE1
00161 R 200461 R LAC TSIDE4
00162 R 040455 R DAC TSIDE3
00163 R 600065 R JMP TARSSET
/
00164 R 040451 R THORZ DAC TSIDE2 /RESTRICTS MOVEMENT IN +Y AND -Y DIRECTIONS
00165 R 040471 R DAC TSIDE6
00166 R 200441 R LAC TSIDE0
00167 R 040445 R DAC TSIDE1
00170 R 200461 R LAC TSIDE4
00171 R 040455 R DAC TSIDE3
00172 R 600143 R JMP TDIR2+1
/
00173 R 040441 R TVERT DAC TSIDE0 /RESTRICTS MOVEMENT IN +X AND -X DIRECTIONS
00174 R 040461 R DAC TSIDE4
00175 R 200451 R LAC TSIDE2
00176 R 040445 R DAC TSIDE1
00177 R 200471 R LAC TSIDE6
00200 R 040475 R DAC TSIDE7
00201 R 600135 R JMP TDIR0+1
.EJECT

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252 /
253 /MOVE TABLE CONTAINING THE X AND Y DISPLACEMENT
254 /VALUES TO MOVE THE TRACKING POINT
255 / (POINT IN CENTER OF OCTAGON)
256 /DISPLACEMENTS ARE 2 RASTOR UNITS IN + OR - DIRECTION
257 /16 ENTRIES, AN X AND Y FOR EACH AXIS DIRECTION
258 /
259 00202 R 000204 R TM/PT1 TMOVE /POINTER TO TOP OF MOVE TABLE
260 00203 R 000000 A TM/PT2 0 /FLOATING MOVE TABLE POINTER
261 /
262 00204 R 000002 A TMOVE 2 /X-DISPLACEMENT
263 00205 R 000000 A 0 /Y-DISPLACEMENT
264 00206 R 000002 A 2
265 00207 R 000002 A 2
266 00210 R 000000 A 0
267 00211 R 000002 A 2
268 00212 R 777776 A -2
269 00213 R 000002 A 2
270 00214 R 777776 A -2
271 00215 R 000000 A 0
272 00216 R 777776 A -2
273 00217 R 777776 A -2
274 00220 R 000000 A 0
275 00221 R 777776 A -2
276 00222 R 000002 A 2
277 00223 R 777776 A -2
278 /
279 /VECTOR TABLE TO BUILD OPTIONAL TRACKING DISPLAY FILE
280 /8 ENTRIES, ONE FOR EACH AXIS DIRECTION
281 /
282 00224 R 000226 R TV/CPT1 TVECT /POINTER TO TOP OF VECTOR TABLE
283 00225 R 000000 A TV/CPT2 0 /FLOATING VECTOR TABLE POINTER
284 /
285 00226 R 420002 A TVECT V10!2 /INTENSIFIED VECTOR, 2 RASTOR UNITS IN DIRECTION 0
286 00227 R 422002 A V11!2
287 00230 R 424002 A V12!2
288 00231 R 426002 A V13!2
289 00232 R 430002 A V14!2
290 00233 R 432002 A V15!2
291 00234 R 434002 A V16!2
292 00235 R 436002 A V17!2
293 .EJECT

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294
295 /THE FOLLOWING MACRO READS SPECIFIED REGISTERS
296 /AND SERVICES SPECIFIED INTERRUPTS
297 /SERVICES PUSHBUTTON AND LIGHT PEN INTERRUPTS, AND READS NAME REGISTER
298 00236 R 140427 R TREAD DZM TBUFF /ZERO FIRST WORD OF ARGUMENT RETURN BUFFER
299 .READ 10,7,TBUFF,1
00237 R 007010 A *G CAL+7*1000 10&777
00240 R 000010 A *G 10
00241 R 000427 R *G TBUFF+0
*G .DEC
00242 R 777777 A *G -1+0
00243 R 300100 A 300100
300
301 /
302 00244 R 200427 R TCK7 LAC TBUFF /GET DESCRIPTOR WORD
303 00245 R 741200 A SNA /SKIP WHEN READ EXECUTED, TBUFF NON ZERO
304 00246 R 600244 R JMP .-2 /READ TEST LOOP
305 00247 R 500411 R AND (200000) /TEST FOR PUSHBUTTON
306 00250 R 740200 A SZA /SKIP IF ZERO, NO PUSHBUTTON HIT
307 00251 R 600363 R JMP TEXIT /EXIT TRACK IF PUSHBUTTON HIT
308 00252 R 200430 R LAC TBUFF+1 /GET NAME REGISTER
309 00253 R 340412 R TAD (-170) /TEST FOR NON TRACK NAME REGISTER
310 00254 R 741100 A SPA /SKIP IF POSITIVE, VALID NAME REGISTER
311 00255 R 600236 R JMP TREAD /GO TO NEXT READ IF INVALID NAME REG
312 00256 R 040425 R DAC TNAM1 /UPDATE NAME REGISTER STORAGE
313 00257 R 340224 R TAD TVCPT1 /ADD VECTOR TABLE BASE ADDRESS
314 00260 R 040225 R DAC TVCPT2 /STORES INDEXED VECTOR TABLE POINTER
315 00261 R 200425 R TCK11 LAC TNAM1 /GET INDEX VALUE (0-7)
316 00262 R 744010 A CLLRAL /DOUBLE THE VALUE
317 00263 R 340202 R TAD TMVPT1 /ADD MOVE TABLE BASE ADDRESS
318 00264 R 040203 R DAC TMVPT2 /STORES INDEXED MOVE TABLE POINTER
319 00265 R 220203 R LAC* TMVPT2 /GET CHANGE IN X
320 00266 R 340434 R TAD TRCK1 /UPDATE X POSITION
321 00267 R 040434 R DAC TRCK1 /RETURN UPDATED VALUE
322 00270 R 440203 R ISZ TMVPT2 /INCREMENT MOVE TABLE POINTER TO Y VALUE
323 00271 R 220203 R LAC* TMVPT2 /GET CHANGE IN Y
324 00272 R 340435 R TAD TRCK1+1 /UPDATE Y POSITION
325 00273 R 040435 R DAC TRCK1+1 /RETURN UPDATED VALUE
326 00274 R 200006 R TCK12 LAC TARRA /EDIT #004) TRACK OR DRAW
327 00275 R 741200 A SNA
328 00276 R 600236 R JMP TREAD /GO TO NEXT READ IF NO ARRAY
329 00277 R 200425 R LAC TNAM1 /TEST DIRECTION OF THIS HIT
330 00300 R 540426 R SAD TNAM2 /AGAINST DIRECTION OF LAST HIT
331 00301 R 600314 R JMP TSAME /HITS IN SAME DIRECTION, COMBINE
332 00302 R 040426 R DAC TNAM2 /IF NOT SAME UPDATE LAST NAME REG
333 00303 R 220225 R TCK13 LAC* TVCPT2 /GET VECTOR FROM TABLE
334 00304 R 060422 R DAC* TARPT1 /DEPOSIT IN USER VECTOR ARRAY
335 00305 R 460421 R ISZ* TARPT0 /UPDATE LENGTH, ARRAY WORD ONE
336 00306 R 440420 R ISZ TARCNT /CHECK FOR ARRAY OVERFLOW
337 00307 R 741000 A SKP /UNCONDITIONAL SKIP
338 00310 R 600320 R JMP TMESS /IF OVERFLOW OCCURS TYPE MESSAGE AND EXIT
339 00311 R 440422 R ISZ TARPT1 /MOVE ARRAY POINTER 1 TO NEXT LOCATION
340 00312 R 440423 R ISZ TARPT2 /MOVE ARRAY POINTER 2 TO NEXT LOCATION

```

PAGE 10 TRACK 007

341 00313 R 600236 R
342

JMP TREAD
.EJECT

/GO TO NEXT READ

```

343 /THIS ROUTINE COMBINES A TWO RASTOR UNIT VECTOR WITH THE LAST
344 /VECTOR IN THE USER ARRAY. WHEN TWO OR MORE LIGHT PEN
345 /HITS HAVE OCCURED IN THE SAME DIRECTION, ONE AFTER THE OTHER
346 /
347
348 00314 R 200405 R TSAME LAC (+2 /SET AC=+2
349 00315 R 360423 R TAD* TARPT2 /ADD 2 TO MAGNITUDE OF LAST ARRAY VECTOR
350 00316 R 060423 R DAC* TARPT2 /REDEPOSIT THE LENGTHENED VECTOR
351 00317 R 600236 R JMP TREAD /GO TO NEXT READ
352 /
353 /
354 /THIS ROUTINE PRINTS A MESSAGE TO THE USER WHEN HIS
355 /VECTOR DISPLAY ARRAY HAS FILLED--AND THEN EXITS TRACK
356 /
357 00320 R TMESS .INIT -3,1,0 /((EDIT #006) INITIALIZE TTY
00320 R 001775 A *G CAL+1*1000 -3&777
00321 R 000001 A *G 1
00322 R 000000 A *G 0+0
00323 R 000000 A *G 0
358 00324 R 002775 A *G .WRITE -3,2,TMB1,16
00325 R 000011 A *G CAL+2*1000 -3&777
00326 R 000333 R *G 11
*G TMB1+0
*G .DEC
*G -16+0
359 00327 R 777760 A *G .WAIT -3
00330 R 000775 A *G CAL -3&777
00331 R 000012 A *G 12
360 00332 R 600363 R JMP TEXIT
361
362 00333 R 004002 A TMB1 TMB2-TMB1/2*1000+2
363 00334 R 000000 A 0
364 00335 R 406452 A .ASCII "ARRAY OVERFLOW"<015>
00336 R 240662 A
00337 R 202372 A
00340 R 642644 A
00341 R 432311 A
00342 R 753432 A
365 000343 R TMB2=.
366 .EJECT

```

367			
368			
369			
370			
371	00343	R	0000000 A
372	00344	R	200413 R
373	00345	R	040425 R
374	00346	R	200414 R
375	00347	R	040225 R
376	00350	R	200501 R
377	00351	R	060225 R
378	00352	R	460225 R
379	00353	R	220225 R
380	00354	R	440225 R
381	00355	R	440225 R
382	00356	R	440225 R
383	00357	R	440225 R
384	00360	R	440425 R
385	00361	R	600351 R
386	00362	R	620343 R
387			
388			
389			
390			
391			
392			
393	00363	R	100343 R
394	00364	R	220053 R
395	00365	R	060054 R
396	00366	R	200434 R
397	00367	R	500415 R
398	00370	R	060003 R
399	00371	R	200435 R
400	00372	R	500415 R
401	00373	R	060004 R
402	00374	R	200411 R
403	00375	R	040506 R
404	00376	R	620000 R
405			

```

/SUBROUTINE TO RESTORE NAME REGISTERS
/WHEN EXITING FROM TRACK

```

```
TREST      0
            LAC      (-10
            DAC      TNAM1
            LAC      (TS IDE0
            DAC      TVCPT2
            LAC      TSIDEX
            DAC*     TVCPT2
            ISZ*     TVCPT2
            LAC*     TVCPT2
            ISZ      TVCPT2
            ISZ      TVCPT2
            ISZ      TVCPT2
            ISZ      TVCPT2
            ISZ      TNAM1
            JMP      .-10
            JMP*     TREST
```

```

/SUBROUTINE TO RESTORE NAME REGISTERS
/SET LOOP COUNTER TO -10 OCTAL

/SET POINTER TO FIRST LOAD NAME REGISTER INSTRUCTION

```

```

/THIS ROUTINE EXITS FROM TRACK AND
/RETURNS CONTROL TO CALLING PROGRAM

```

TEXT	JMS	TREST
	LAC*	TTEMP1
	DAC*	TTEMP2
	LAC	TRCK1
	AND	(1777)
	DAC*	TX
	LAC	TRCK1+1
	AND	(1777)
	DAC*	TY
TCK15	LAC	(DNOP
	DAC	TRCK2
	JMP*	TRACK
	.EJECT	

```

/GO TO SUBROUTINE, RESTORES NAME REGISTERS

/REMOVES LINK TO TRACK DISPLAY FILE
/GET X-PARAMETER FROM DISPLAY FILE

/RETURN FINAL X POSITION
/GET Y-PARAMETER FROM DISPLAY FILE

/RETURN FINAL Y POSITION
/GET DNOP INSTRUCTION
/REMOVE LINK FROM TRACK DISPLAY FILE TO USER ARRAY
/RETURN TO CALLING PROGRAM

```

406

.LTORG

```

00377 R 007777 A *L
00400 R 144000 A *L
00401 R 160000 A *L
00402 R 017777 A *L
00403 R 660000 A *L
00404 R 000056 R *L
00405 R 000002 A *L
00406 R 000004 A *L
00407 R 000001 A *L
00410 R 620000 A *L
00411 R 200000 A *L
00412 R 777610 A *L
00413 R 777770 A *L
00414 R 000441 R *L
00415 R 001777 A *L

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407

.EBREL

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00416 R 000432 R TRCKA TRCK
00417 R 660510 R TRCK3A DJMSI TRCK3
00420 R 000000 A TARCNT 0
00421 R 000000 A TARPT0 0
00422 R 000000 A TARPT1 0
00423 R 000000 A TARPT2 0
00424 R 000000 A TSTCNT 0
00425 R 000000 A TNAM1 0
00426 R 000000 A TNAM2 0
00427 R A TBUFF .BLOCK 3
/
/
/

```

/COUNTS AVAILABLE ARRAY LOCATIONS

/POINTER TO TOP OF USER ARRAY

/POINTER TO USER ARRAY, FOLLOWS BEHIND TARPT2

/FLOATING POINTER TO USER ARRAY

/INITIALIZATION COUNTER

/STORES NAME REGISTER OF PRESENT LIGHT PEN HIT

/STORES NAME REGISTER OF LAST LIGHT PEN HIT

/.READ BUFFER

/NOTES:

423
424
425
426
427
428
429

/THE FINAL X,Y. POSITION LIMITS <24...999> DECIMAL, <30...1747> OCTAL
/CAUSE OF THE LIMIT DIFFERENCE:
/THE TRACKING PATTERN IS UNABLE TO BE MOVED WITHIN 24 DECIMAL RASTOR
/UNITS OF THE SCREEN EDGE BECAUSE INTENSIFIED VECTORS DISAPPEAR WHEN
/ANY PART OF THE VECTOR VIOLATES A SCREEN EDGE.
/

.EJECT

430
431
432
433
434 00432 R 000000 A
435 00433 R 211056 A
436 00434 R 200000 A
437 00435 R 200000 A
438 00436 R 203620 A
439 00437 R 400030 A
440 00440 R 414012 A
441 00441 R 234570 A
442 00442 R 565124 A
443 00443 R 565124 A
444 00444 R 564522 A
445 00445 R 234571 A
446 00446 R 566733 A
447 00447 R 566532 A
448 00450 R 566532 A
449 00451 R 234572 A
450 00452 R 571144 A
451 00453 R 571144 A
452 00454 R 570542 A
453 00455 R 234573 A
454 00456 R 572753 A
455 00457 R 572552 A
456 00460 R 572552 A
457 00461 R 234574 A
458 00462 R 574564 A
459 00463 R 574564 A
460 00464 R 574562 A
461 00465 R 234575 A
462 00466 R 576773 A
463 00467 R 576572 A
464 00470 R 576572 A
465 00471 R 234576 A
466 00472 R 561104 A
467 00473 R 561104 A
468 00474 R 560502 A
469 00475 R 234577 A
470 00476 R 562713 A
471 00477 R 562512 A
472 00500 R 562512 A
473 00501 R 234567 A
474 00502 R 202600 A
475 00503 R 210010 A
476 00504 R 410030 A
477 00505 R 404012 A
478 00506 R 200000 A
479 00507 R 620432 R
480 00510 R 000000 A
481 000000 A

/ TRACK RESIDENT DISPLAY FILE

/ PUTS TRACKING POINT AND SURROUNDING OCTAGON ON THE DISPLAY

/ TRACK 0 / STORES RETURN ADDRESS

OSETF!ROTOF!BKOF!LPON

TRACK1 DNOP / X-POSITION OF TRACK POINT

DNOP / Y-POSITION OF TRACK POINT

INT7!INCROF / SET INTENSITY LEVEL ?

V0130

V6112

TSIDE0 LDNM1170 / LOAD NAME REGISTER

565124

565124

564522

TSIDE1 LDNM1171

566733

566532

566532

TSIDE2 LDNM1172

571144

571144

570542

TSIDE3 LDNM1173

572753

572552

572552

TSIDE4 LDNM1174

574564

574564

574562

TSIDE5 LDNM1175

576773

576572

576572

TSIDE6 LDNM1176

561104

561104

560502

TSIDE7 LDNM1177

562713

562512

562512

TSIDEX LDNM1167

INT3

LPOF

V4130

V2112

TRACK2 DNOP

DJMPI

TRACK

TRACK3 0

.END

/ LIGHT PEN OFF

/ RETURN BEAM TO CENTER OF SYMBOL ***005***

/ SO ITEM CAN FOLLOW TRACKING ***005***

/ STORES DJMS1 TO ARRAY+1, IF ARRAY PRESENT

/ RETURNS TO MAIN FILE

/ POINTER TO ARRAY WORD 2, FOR INDIRECT ADDRESSING

PAGE 15 TRACK 007

00511 R 000511 E *E

00512 R 000512 E *E

SIZE=00513 NO ERROR LINES

BKOF	211000	75*							
DJMP	600000	83*							
DJMPI	620000	84*	182	479					
DJMS	640000	85*							
DJMSI	660000	86*	140	409					
DNOP	200000	82*	402	436	437	478			
DSKP	235000	87*							
INCROF	200020	76*							
INT	020000	53*							
INT3	202600	89*	474						
INT7	203600	88*	438						
LDNM	234400	78*	441	445	449	453	457	461	465
		469	473						
LPOF	210010	80*	475						
LPON	210014	79*							
MF.102	00511	125							
OSETF	210002	73*	435						
PX	144000	51*	118						
PY	140000	52*	122						
ROTOF	210040	74*							
TARCNT	00420	192	336	410*					
TARPT0	00421	165	169	179	335	411*			
TARPT1	00422	167	171	172	174	175	177	183	194
		196	334	339	412*				
TARPT2	00423	176	340	349	350	413*			
TARRA	00006	101*	116	162	326				
TARSET	00065	155	162*	213	220	227	234		
TBUFF	00427	298	299	302	308	417*			
TCK1	00010	111*							
TCK11	00261	315*							
TCK12	00274	326*							
TCK13	00303	333*							
TCK15	00374	402*							
TCK2	00025	125*							
TCK3	00046	142*							
TCK4	00075	170*							
TCK5	00105	178*							
TCK7	00244	302*							
TDIR0	00134	158	208*	250					
TDIR2	00142	159	215*	242					
TDIR4	00150	160	222*						
TDIR6	00156	161	229*						
TDISP	00056	143	155*						
TEXIT	00363	307	360	393*					
THORZ	00164	156	236*						
TMB1	00333	358	362*	362					
TMB2	000343	362	365*						
TMESS	00320	191	338	357*					
TMOVE	00204	259	262*						
TM/PT1	00202	259*	317						
TM/PT2	00203	260*	318	319	322	323			
TNAM1	00425	312	315	329	373	384	415*		
TNAM2	00426	119	330	332	416*				

TOPTA	00005	100*	142						
TOPT1	00057	156*							
TRACK	00000	47	95*	112	13	12	404		
TRCK	00432	408	434*	479					
TRCKA	00416	136	408*						
TRCK1	00434	121	124	170	173	320	321	324	325
		396	399	436*					
TRCK2	00506	185	403	478*					
TRCK3	00510	180	409	480*					
TRCK3A	00417	184	409*						
TREAD	00236	164	201	298*	311	328	341	351	
TREST	00343	371*	386	393					
TSAME	00314	331	348*						
TSIDEX	00501	145	376	473*					
TSIDE0	00441	218	222	230	238	244	374	441*	
TSIDE1	00445	224	231	239	247	445*			
TSIDE2	00451	209	223	229	236	246	449*		
TSIDE3	00455	210	233	241	453*				
TSIDE4	00461	208	216	232	240	245	457*		
TSIDE5	00465	212	217	461*					
TSIDE6	00471	211	215	225	237	248	465*		
TSIDE7	00475	219	226	249	469*				
TSIZE	00007	102*	188						
TSTCNT	00424	193	199	414*					
TTEMP1	00053	128	131	135	147*	394			
TTEMP2	00054	129	134	141	148*	395			
TTEMP3	00055	130	132	133	137	138	144	146	149*
		195	197	198					
TV/CPT1	00224	282*	313						
TV/CPT2	00225	283*	314	333	375	377	378	379	380
		381	382	383					
TVECT	00226	282	285*						
TVERT	00173	157	244*						
TX	00003	98*	120	398					
TY	00004	99*	123	401					
V10	420000	55*	285						
V11	422000	56*	286						
V12	424000	57*	287						
V13	426000	58*	288						
V14	430000	59*	289						
V15	432000	60*	290						
V16	434000	61*	291						
V17	436000	62*	292						
V0	400000	64*	439						
V1	402000	65*							
V2	404000	66*	477						
V3	406000	67*							
V4	410000	68*	476						
V5	412000	69*							
V6	414000	70*	440						
V7	416000	71*							
.CLEAR	MACRO								
.CLOSE	MACRO								

.DA	00512	96
.DELETE	MACRO	
.ENTER	MACRO	
.EXIT	MACRO	
.FSTAT	MACRO	
.GET	MACRO	
.GTBUF	MACRO	
.GVBUF	MACRO	
.INIT	MACRO	357
.MTAPE	MACRO	
.MTRAN	MACRO	
.OVLRA	MACRO	
.PUT	MACRO	
.RAND	MACRO	
.READ	MACRO	299
.RENAM	MACRO	
.RTRAN	MACRO	
.SEEK	MACRO	
.SETUP	MACRO	
.SYSID	MACRO	
.TIMER	MACRO	
.TRAN	MACRO	
.USER	MACRO	
.WAIT	MACRO	359
.WAITR	MACRO	
.WRITE	MACRO	358
.X/MOF	MACRO	
.X/MON	MACRO	